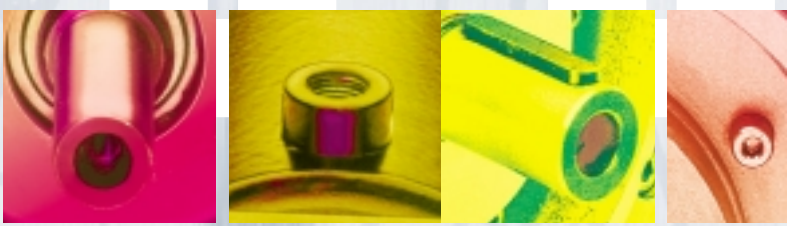
Baureihe W

maximale Dauerleistung

durch Wasserkühlung

AC-SERVOMOTOREN
AC SERVO MOTORS



W Series

maximum continuous

power through

water cooling

BAUTZ STELLT SICH VOR

Das Unternehmen

Seit 1966 spezialisiert sich BAUTZ auf hochgenaue Positionierantriebe.
BAUTZ entwickelte sich schnell zu einem erfolgreichen Antriebsspezialisten mit Applikations- und Entwicklungs-Know-how. Heute verfügt BAUTZ über eine komplette Palette an Antriebslösungen für die vielfältigsten Anforderungen.
Die Integration in die global operierende Danaher Corporation erweiterte unsere erfolgreiche internationale Präsenz und ermöglicht innovative Produktentwicklungen entsprechend den Marktanforderungen.
Mehr denn je profitieren unsere Kunden heute von den Vorteilen eines internationalen Großunternehmens und einer Firmenphilosophie, bei der Kundenzufriedenheit, hochwertige Produkte und Qualität im Vordergrund stehen.

Unsere Ziele – Ihre Vorteile

Die Wünsche unserer Kunden sind der Mittelpunkt unseres Handelns. Wir richten uns nach Ihren Bedürfnissen und Anforderungen.

Unsere Vertriebsingenieure helfen Ihnen bei der Auswahl und Entwicklung individueller Antriebslösungen für Ihre speziellen Applikationen.

Unser breites Produktspektrum sowie eine kontinuierliche Weiterentwicklung in Zusammenarbeit mit unseren Kunden bieten Ihnen maßgeschneiderte Lösungen für Ihren Bedarf. Somit helfen wir Ihnen, sich durch technologischen Fortschritt Wettbewerbsvorteile in Ihren Märkten zu sichern.

Ihre Applikationen – unsere Kompetenz

Sie finden unsere Produkte überall dort, wo es auf hochdynamische und präzise Bewegungsabläufe ankommt.
Wir zeichnen uns aus durch Flexibilität, Genauigkeit und Zuverlässigkeit bei den unterschiedlichsten Anwendungen in Bereichen wie:

- Roboter- und Handhabungstechnik
- Leiterplattenfertigung
- Textilindustrie
- Verpackungsindustrie
- Allgemeine Automatisierungstechnik

Besondere Stärke zeigen wir, wo immer individuelle Lösungen und Applikations-Know-how gefordert sind.

The Company

Since 1966 BAUTZ specializes in products for high performance positioning applications.
Since then BAUTZ has developed to a motion control supplier with respectable application and developing know-how. Today we offer our customers a complete range of motion control solutions for all sorts of demands.
The integration into the Danaher Corporation has increased our successful international presence and our capability for innovative product developments which meet the changing market demands.
Our customers now benefit even more from the advantages of a global multi-billion dollar company and a philosophy focusing on customer satisfaction, product value and quality.

Our Targets – Your Advantages

Our customers are the focal point of our business. We focus all our activities on your needs and requirements.

Our sales engineers are your competent assistance partners concerning selection and development of appropriate motion control solutions for your individual applications.

Our wide product range as well as steadily ongoing developments in co-operation with our customers provide tailor-made solutions for your demands. Thus we may help you to gain and preserve competitive advantages through technological improvements.

Your Applications – our competence

You will find our products wherever highly dynamic and precise motion sequences are basic requirements. We distinguish ourselves with flexibility, accuracy and reliability when it comes to our customers needs concerning all sorts of applications within various industrial segments, such as:

- Robotics and handling
- PCB production
- Textile industry
- Packaging industry
- General automation purposes

We show our strength, wherever individual solutions and application know-how are required.

AC SERVO MOTORS
SERIES M, W AND F

The construction of the AC brushless servo motor is equal to that of a permanent magnet synchronous motor. The three-phase winding is located in the stator housing, which provides high efficiency and smooth running characteristics. The rotor carries neodymium-iron-bor magnets on its surface, which give the motor its high dynamic characteristic. Due to the skew of the stator the torque ripple is very low. All motors have six poles and thus offer an optimum between achieveable speed and smooth running.

Three product lines are available:

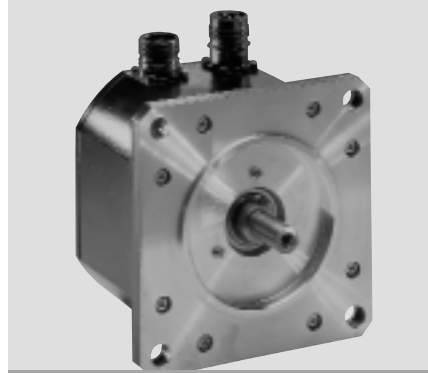
- The **M Series** motors are characterized by the slim motor body and their extremely high torque-to-inertia ratio especially designed for highly dynamic applications.
- The **W Series** motors are M-series motors with water cooling. Based on this, they offer about twice of the output power of the M-series comprising their extraordinary dynamic features.
- The **F Series** are compact, short body motors (pancake type) with very good dynamic properties for the use in applications where space is confined.

Features:

- High motor torque at low rotor inertia
- Rare-earth magnets for high peak torque
- Windings designed for sinusoidal commutation
- Integrated hollow-shaft resolver as standard
- High mounting accuracy in accordance to DIN 42955 R standards
- Maintenance-free
- Thermal protection
- Speeds of up to 12.000 rpm
- Sealing IP65 (except front flange)
- CE-approved design
- Several options available

Series M

Series W



Series F

Resolver

The standard feedback system is a brushless hollow-shaft resolver. For high motor stiffness even at large speed-loop gains, the resolver rotor is fixed to the motor shaft. The resolver provides commutation information as well as speed and position feedback information. Its rugged design resists shocks, temperature increases in the motor and interferences caused by back EMF.

Thermal protection

All our brushless servo motors are equipped with thermo switches, which protect the winding against damage in case of continuous overload. If the temperature in the winding exceeds 135°C (M25x series: 125°C) for a certain time period, the contact opens. In case of a temporary overload of the motor originating from higher currents, it is important that the rms current I_{rms} of the servo drive does not exceed 150% of the motor's rated current I_N. ***When using an amplifier which exceeds 150% of the rms current, the winding protection must be accomplished by rms current detection devices in the drive***. For larger order quantities we can integrate thermistors as an optional protection.

Connectors

The electrical connection of motor and resolver is realized via two receptacles or a terminal box.

Gearheads

All motors are available with low backlash planetary gearheads. For further information please contact us.

TECHNICAL DATA EXPLANATION

Stall torque M_0 [Nm]
Torque at the stalled motor shaft at nominal temperature of the winding.

Stall current I_0 [A]
Required rms current to achieve the stall torque M_0.

Torque constant k_T [Nm/A]
Ratio of the stall torque M_0 at an ambient temperature of +20°C and the rms stall current I_0.

Rated voltage U_Z [V_{DC}]
DC bus voltage generated out of the AC mains input voltage. The DC bus voltage equals the input voltage multiplied by $\sqrt{2}$. Common DC bus voltages of Bautz motors are 330 V_{DC} at an input voltage of 230V_{AC} and 560 V_{DC} at an input voltage of 400V_{AC}.

Rated torque M_N [Nm]
Constant permitted moment of load at the motor shaft while the motor runs at rated speed and nominal winding temperature.

Rated current I_N [A]
rms motor current at load with rated torque and rated speed.

Rated speed n_N [min^{-1}]
Speed resulting from the intersection of the amplifier DC bus voltage limitation curve and the continuous torque curve, representing the maximum achievable speed at rated torque.

Rated power P_N [W]
Mechanical power at the motor shaft which is loaded with rated torque at rated speed. The rated power is determined under thermal stabilized conditions. During determination the motor is mounted to a flange according to specified dimensions.

Back EMF constant K_E [V/kmin^{-1}]
rms phase to phase voltage of the motor determined via 2 motor terminals (U-V, V-W, W-U) at a no-load speed of 1000 rpm at an ambient temperature of +20°C.

Phase to phase inductance L_{U-V} [mH]
Inductance between two motor terminals (U-V, V-W, W-U) at an ambient temperature of +20°C. This inductance is measured with an AC voltage of 1000 Hz.

Phase to phase resistance R_{U-V} [Ω]
Resistance between two motor terminals (U-V, V-W, W-U) at an ambient temperature of +20°C.

Max. torque M_{Omax} [Nm]
The max. torque generated with motor current I_{Omax} at stalled motor shaft with rated winding temperature.

Max. motor current I_{Omax} [A]
The highest rms current that is achievable from the DC bus voltage U_Z and does not cause demagnetization of the permanent magnets. Permissible run time with I_{Omax} is specified in our application note “Overload Behaviour of MWF Motors“.

Max. speed n_{mech} [min^{-1}]
Highest permitted speed for which the rotor is mechanically designed.

Moment of inertia J [$kgm^2 \cdot 10^{-3}$]
Moment of inertia of the rotor with resolver, without brake, etc.

Weight m [kg]
Weight of the motor with resolver, without accessories and brake, etc.

Axial load F_A [N]
Nominal axial load of the free shaft end at a given speed and a bearing life of 20.000 hours. (Please refer also to the FA-FR curves of the motors.)

Radial load F_R [N]
Nominal radial load of the free shaft end at a given speed and a bearing life of 20.000 hours. (Please refer also to the F_A-F_R curves of the motors.)

EMV AND CE REGULATIONS

Regarding the EMV regulations all motors of the series M, F and W are in accordance to the standards EN50081.1, EN50081.2 and EN50082.1, which describe interference immunity and interference emission.
The motors are designed and tested according to the standards EN60034 and EN60204.1.

BAUTZ

TORQUE SPEED CURVES EXPLANATION

The technical data of the motors is supplemented by torque speed curves. The combination of the motor with an appropriate drive is assumed. Depending on the application the rms torque value is the value of all required torque values during a duty cycle.

The resulting rms torque has to be within the CONTINUOUS TORQUE DUTY ZONE. The upper limit, which is the INTERMITTENT TORQUE DUTY ZONE, indicates the maximum torque which the motor can perform for a short period of time. Here a maximum current of 4-5 times as much as the stall current is required. The motor heats up to 16-25 times more than it would do at rated current.

The built-in thermo switch protects the motor up to 1,5 times of the motor rated current. If the motor runs at more than 1,5 times of its rated value during intermittent duty, the operation cycle time must be shorter than the thermal time constant of the motor. (See also our corresponding application note „Overload Behaviour of MWF Motors“.)
This can be achieved by limiting the rms-value of the output current of the controller to a maximum of 1.5 times the nominal current of the motor. When using an amplifier which exceeds 150% of the rms current, the winding protection must be accomplished by rms current detection devices in the drive.

The declining lines show the operating limits of the motor and amplifier combination for corresponding bus voltages (rms-value).

WATER SPECIFICATION FOR WATER-COOLED SERVOMOTORS SERIES W

Rated water flow Q_N [l/min]
The flow rate that is necessary for the motor to perform with its rated values at nominal winding temperature.

Maximum water inlet pressure (< 1min) P_{MAX} = 10 Bar
The maximum water pressure for which the cooling system is designed – can be applied for a short period of time (< 1 min) at the entry.

Rated water inlet pressure P_N = 5 Bar max.
The minimum water pressure which is at least necessary to reach the required rate of flow.

Minimum water pressure difference P_W [kPa]
Necessary pressure difference between water inlet and outlet to achieve the required water flow.

Rated water inlet temperature T_N = +20°C up to +40°C
The water inlet temperature has to be within this range in order to guarantee the rated values of the motor.

Water quality
Distilled water max. 0,7 mmol/l water hardness filtered, no solid particles, PH-value: 6,5 to 7,5, without aggressive additives.

In order to prevent corrosion of aluminium, we recommend to use inhibitors. The ratio of the inhibitor to water should not exceed 25% to 75%. Otherwise cooling performance may be reduced.

Furthermore we recommend the usage of a detector for the water pressure and the rate of water flow in order to prevent the unlike event of an emergency shut down of the machine due to an overheated servo motor.

The whole water cooling circuit should be examined whether there are materials which are in touch with the cooling liquid and:

A) have a certain voltage drop according to the electro-chemical voltage order

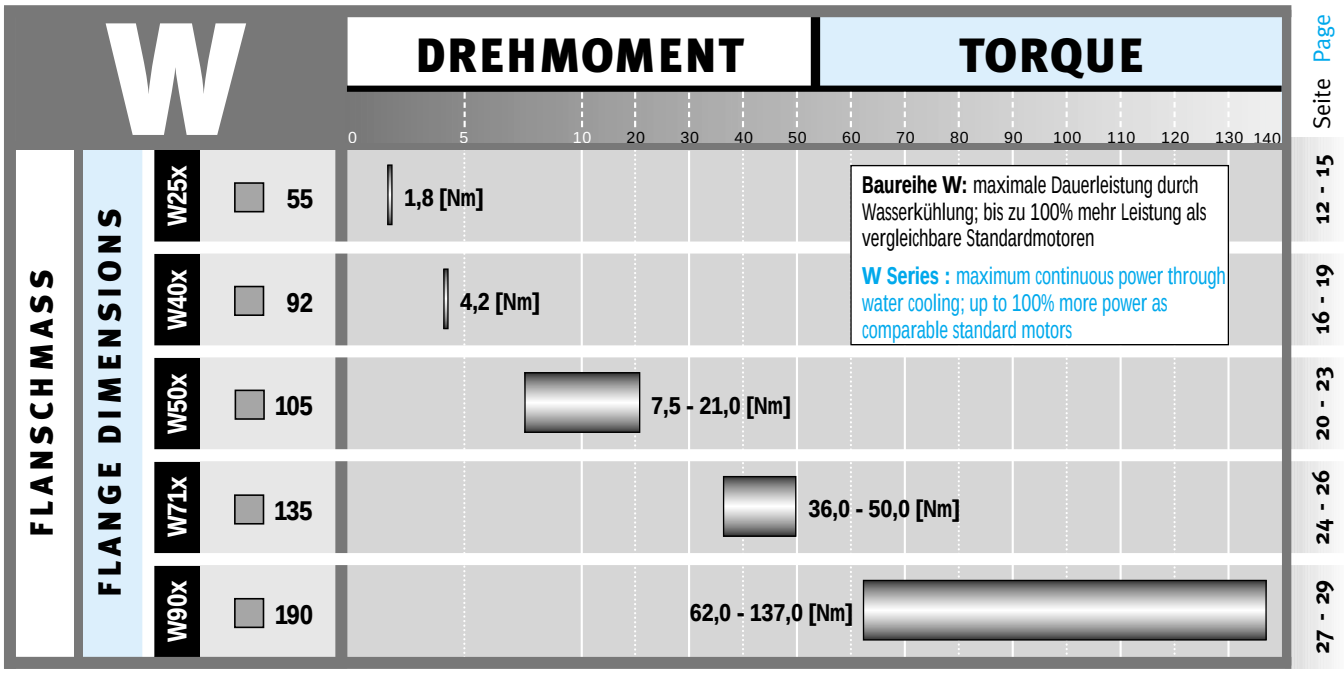
and

B) are electrically connected so that an electro-galvanizing process can take place. In this case the less noble metal will be destroyed and enriched at the better metal.

The specifications are valid for closed cooling circuits.

Motortypen

Motor Types



Seite Page

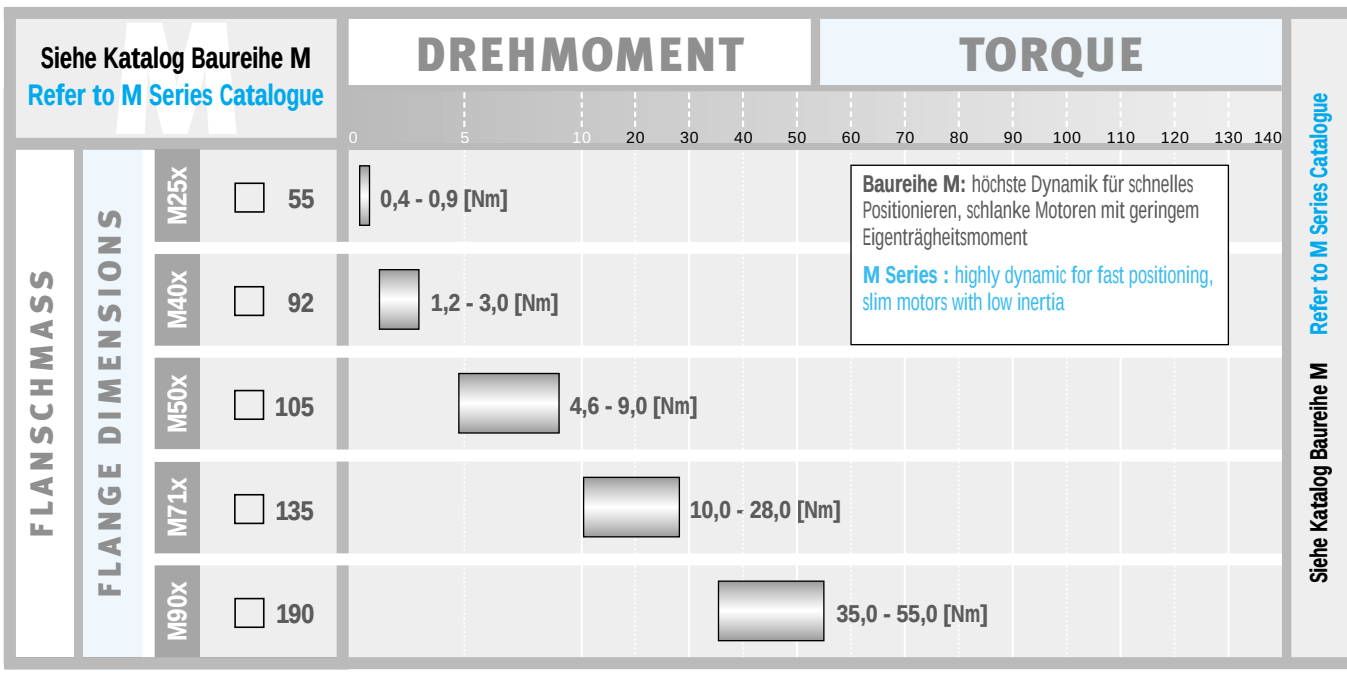
12 - 15 W25x

16 - 19 W40x

20 - 23 W50x

24 - 26 W71x

27 - 29 W90x



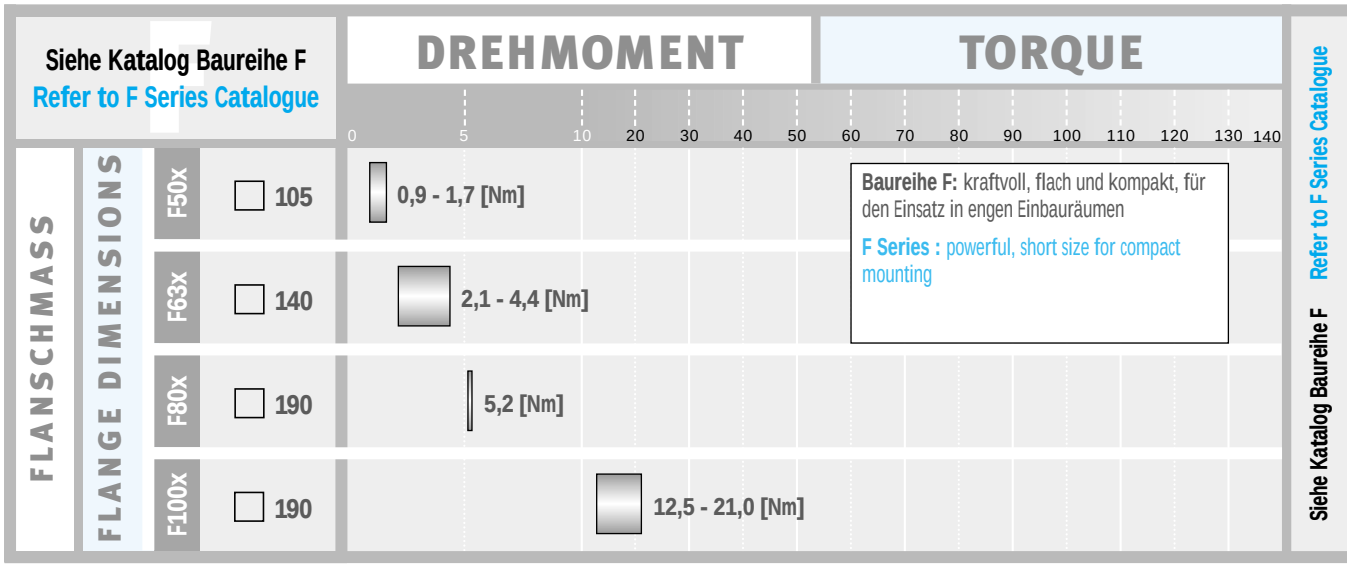
M25x

M40x

M50x

M71x

M90x



F50x

F63x

F80x

F100x

Wassergekühlte
AC-Servomotoren der Baureihe W

AC-Servomotoren der Baureihe W zeichnen sich gegenüber anderen AC-Servomotoren durch ihr geringes Eigenträgheitsmoment aus, das durch ihre längliche, schlanke Motorkonstruktion erreicht wird. Der Einsatz hochenergetischer NeFeB Magnete ermöglicht extreme Beschleunigungs- und Bremsvorgänge. Im Gegensatz zu den konvektionsgekühlten Motoren der Standard-Baureihe M (siehe separaten Katalog) in gleicher Bauform sind sie zusätzlich mit einem Wasserkühlmantel ausgerüstet.
Dieser Wasserkühlmantel ermöglicht mit seiner spiralförmigen inneren Kühlschlange und dem sehr kleinen Wärmeübergangswiderstand zum Stator eine sehr hohe Dauerleistungsabgabe des Motors. Das Stillstandsdrehmoment erhöht sich dadurch um 100% und das Nenndrehmoment bei höheren Drehzahlen, je nach Motor, um 150-200%. Dies begründet sich durch Zusatzverluste des Motors bei hohen Drehzahlen, die bei einem Motor ohne Wasserkühlung zu einem mehr oder weniger starken Drehmomentabfall bei steigender Drehzahl führen. Bei AC-Servomotoren der Baureihe W gibt es diesen Abfall nur in wesentlich kleinerem Umfang oder gar nicht. Sie eignen sich daher vor allem für hochdynamische Applikationen, bei denen ein hohes Dauerdrehmoment, im Stillstand oder bei höheren Drehzahlen, verbunden mit einem sehr kompakten Motoraufbau, gefordert ist. SinCos-Geber und diverse Steckverbindungen gehören zu den Standardoptionen, die eine individuelle Anpassung an die jeweilige Applikation ermöglichen.

Water-cooled
AC Servo Motors W Series

In comparison with common AC servo motors the W series motors distinguish by their low inertia, which is achieved by a long and slim rotor construction. The use of high-energetic NeFeB magnets allows extreme acceleration and deceleration operations.
The motors have the same mechanical design as our standard motors with convectional cooling of the M series (please refer to separate catalogue) but are additionally equipped with a water cooling device.
With its inner cooling spiral and the very low heat transfer resistance to the stator the water-cooling allows a very high continuous power output. Compared with standard motors the holding torque increases by 100% and the rated torque at higher speed raises about 150-200% depending on the motor type. The difference is explained by the additional losses of motors without water-cooling during high speed operation which cause a torque reduction at increasing speed whereas this torque reduction of the W series motors is much smaller or does not occur at all.
Thus the water-cooled W series motors are recommended especially for applications where high rated torques (at standstill or at higher speed ranges) combined with a very compact motor design are required. Sine/cosine encoder and several connectors are available as standard options for an individual adaptation to the respective application.

Allgemeine technische Daten

General Technical Data

Bauform	Mounting	B5	B5
Lackierung	Coating	matt schwarz RAL 9005	pale black RAL 9005
Lagerung	Bearing	Kugellager, lebensdauergeschmiert	ball bearings with life time lubrication
Flanschgenauigkeit	Flange accuracy	nach DIN 42955 „R“	according to DIN 42955 “R“
Schutzart	Protection class	IP 65 ohne A-Welle	IP 65 without A-shaft
Isolierklasse	Insulation class	F nach VDE 0530	class F according to VDE 0530
Kühlung	Cooling	Wasserkühlung	water cooling
Wassereingangstemp.	Water inlet temperature	T_n = +20°C bis +40°C	T_n = +20°C up to +40°C
Wassereingangsdruck	Water inlet pressure	P_n = 5 Bar max.	P_n = 5 Bar max.
Leistungsabgabe	Performance definition	nach VDE 0530, $T_{Ü}$ = 105K	according to VDE 0530, T_{rise} = 105K
Wicklungsschutz	Winding protection	Thermoschalter	thermo switch
Polzahl	Poles	6	6
Normen	Standards	CE, EN 60034, EN 60204-1, EN 50081.1 EN 50081.2, EN 50082.1	CE, EN 60034, EN 60204-1, EN 50081.1 EN 50081.2, EN 50082.1

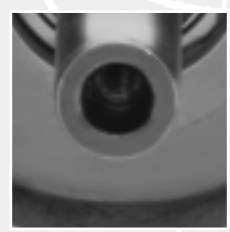
STANDARDAUSFÜHRUNG:

- Glatte Welle, Tol. „R“ nach DIN 42955
- Resolver
- W25 und W40: zwei gerade Flanschdosen für Leistung und Signal
- W50 bis W90: Klemmenkasten mit seitlicher Winkelflanschdose

STANDARD VERSION:

- Straight shaft, Tol. “R“ acc. to DIN 42955
- Resolver
- W25 and W40: two straight receptacles for power and signal
- W50 up to W90: terminal box with right angle receptacle

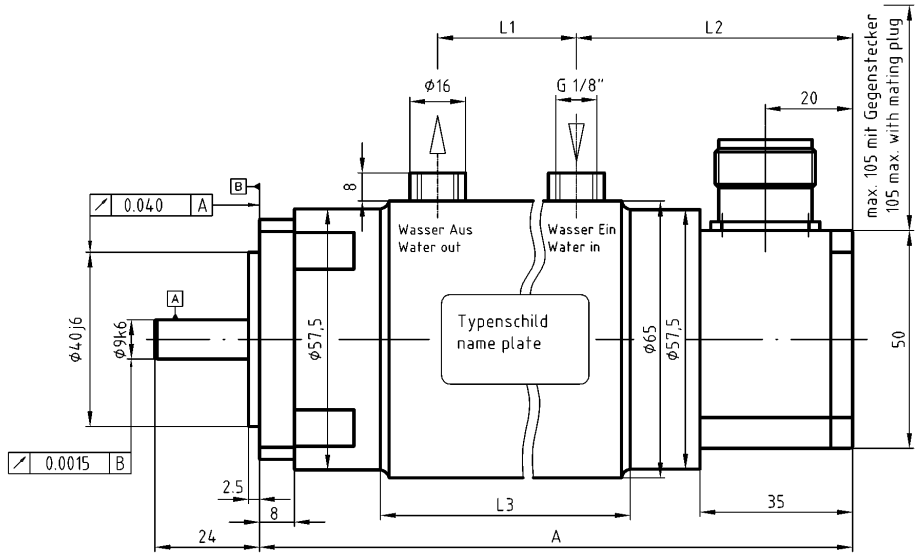


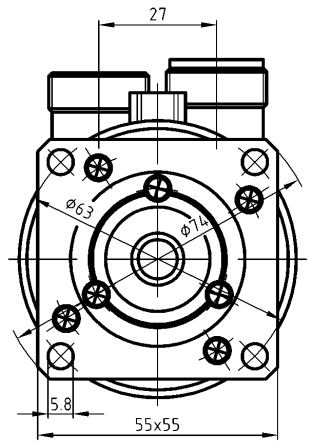


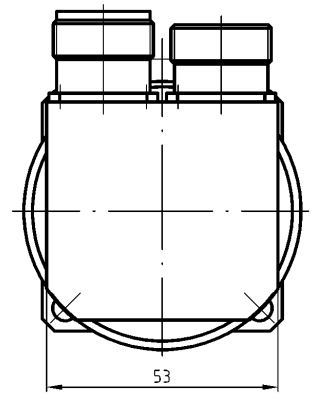

Baugröße: W25x

Size: W25x

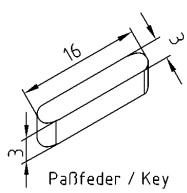
Maßzeichnungen in mm
Drawings in mm



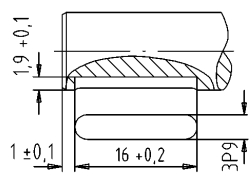




Motortyp	Motor type	W258
A	A	182
L1	L1	61
L2	L2	81
L3	L3	89



Paßfeder / Key
A3x3x16 DIN6885



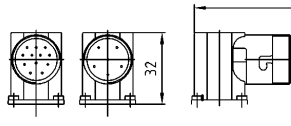
Option Paßnut DIN6885
Option keyway DIN6885

Motor

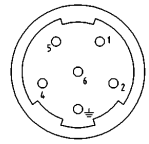
1 U
2 W
5 V
GND

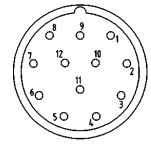
Resolver

1 S1 cos+
2 S3 cos-
3 S4 sin-
4 S2 sin+
5 R1 R
6 R2 L
7 Thermoschalter/ Thermo switch
8 Thermoschalter/ Thermo switch



Option Flanschdose
B-seitig abgewinkelt
Option right-angle socket to B-side





Ansicht Gegenstecker- Lötseite
View from solder side of mating plugs

Resolver-Nenndaten*1

Resolver Data (nominal)*1

Eingangsspannung	Input Voltage	V_{AC} rms	7,0	Übersetzung	Transformation ratio		0,5
Eingangsfrequenz	Input frequency	kHz	10,0	Polzahl	Poles		2
Eingangsstrom	Input current	mA rms	40	Genauigkeit	Accuracy	arcmin	±10
Z_{SO}	Z_{SO}	Ω	245 + J430	Z_{SS}	Z_{SS}	Ω	210 + J395
Z_{RO}	Z_{RO}	Ω	78 + J190	Z_{RS}	Z_{RS}	Ω	65 + J175

*1 Betrieb außerhalb der Nennwerte möglich: ggf. Abweichungen der spezifizierten Ausgangswerte Operation outside nominal values is possible: specified output values may deviate

Standard-Optionen

Standard Options

Welle	Shaft	mit Nut + Passfeder gemäß DIN 6885	with keyway + key according to DIN 6885
Elektrischer Anschluss	El. connection	Flanschdosen in abgewinkelter Ausführung Richtung B-Seite	right angle receptacles directed to B-side

Sonder-Optionen*2

Special Options*2

Schutzart	Protection class	Wellendichtring IP 64	shaft seal IP 64
Rückmeldesystem	Feedback system	Inkrementaldrehgeber, SinCos-Encoder	incremental encoder, SinCos encoder
Getriebe	Gearboxes	spielarme Getriebe	low backlash gearboxes

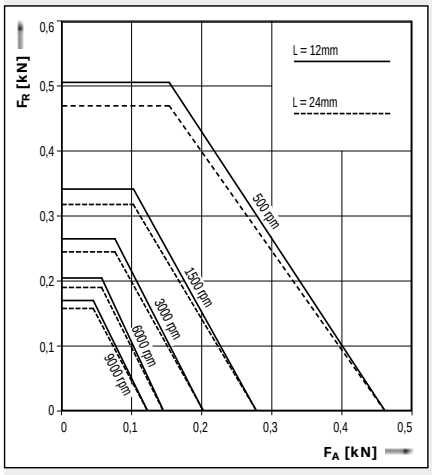
*2 Nähere Informationen auf Anfrage Further information upon request

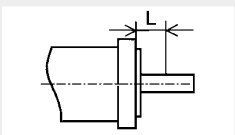
! **Gegenstecker sind separat zu bestellen, Bestell-Nr. 57.397** **Mating plugs have to be ordered separately, order code 57.397** !

Zulässige Radial- und Axialbelastungen der Wellenenden

Radial and axial Shaft Load Capacity

W258





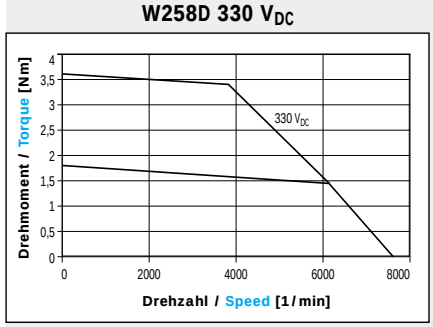
Die angegebenen Werte gelten nur für waagrechten Einbau
The given values for axial and radial load are only for horizontal mounting

Motoren für **330 V_{DC}** (Zwischenkreisspannung) Motors for **330 V_{DC}** (Bus Voltage)

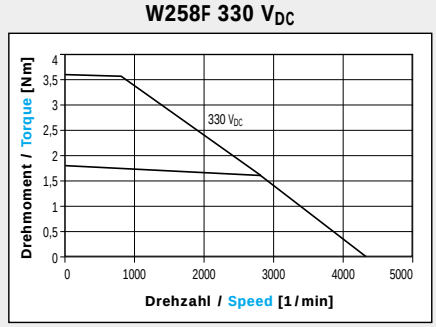
				W258D	W258F				
Stillstandsmoment	Stall torque	M_0	Nm	1,80	1,80				
Stillstandsstrom	Stall current	I_0	A	4,35	2,47				
Nenndrehmoment	Rated torque	M_N	Nm	1,45	1,64				
Nennstrom	Rated current	I_N	A	3,84	2,35				
Nenndrehzahl	Rated speed	n_N	min^{-1}	6159	2791				
Nennleistung	Rated power	P_N	W	935	480				
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	25	44				
Drehmomentkonstante	Torque constant	k_T	Nm/A	0,413	0,728				
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	6,8	22,1				
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	5,6	19,6				
Max. Stillstandsmoment	Max. stall torque	$M_{0\,max}$	Nm	3,6	3,6				
Max. Stillstandsstrom	Max. stall current	$I_{0\,max}$	A	10,0	5,7				
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	9000	9000				
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	0,0165	0,0165				
Masse	Weight	m	kg	2,1	2,1				
Durchflussmenge	Water flow	Q_W	l/min	1,0	1,0				
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	0,9	0,9				

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

W258D 330 V_{DC}



W258F 330 V_{DC}

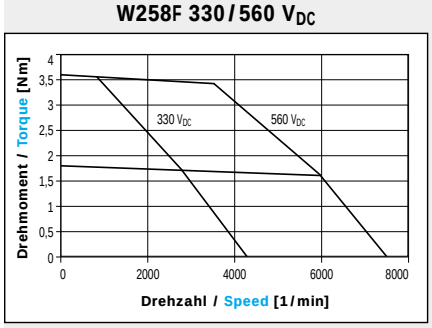


Motoren für **560 V_{DC}** (Zwischenkreisspannung) Motors for **560 V_{DC}** (Bus Voltage)

				W258F					
Stillstandsmoment	Stall torque	M_0	Nm	1,80					
Stillstandsstrom	Stall current	I_0	A	2,47					
Nenndrehmoment	Rated torque	M_N	Nm	1,46					
Nennstrom	Rated current	I_N	A	2,20					
Nenndrehzahl	Rated speed	n_N	min^{-1}	5939					
Nennleistung	Rated power	P_N	W	909					
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	44					
Drehmomentkonstante	Torque constant	k_T	Nm/A	0,728					
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	22,1					
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	19,6					
Max. Stillstandsmoment	Max. stall torque	$M_{0\ max}$	Nm	3,6					
Max. Stillstandsstrom	Max. stall current	$I_{0\ max}$	A	5,7					
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	9000					
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	0,0165					
Masse	Weight	m	kg	2,1					
Durchflussmenge	Water flow	Q_W	l/min	1,0					
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	0,9					

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

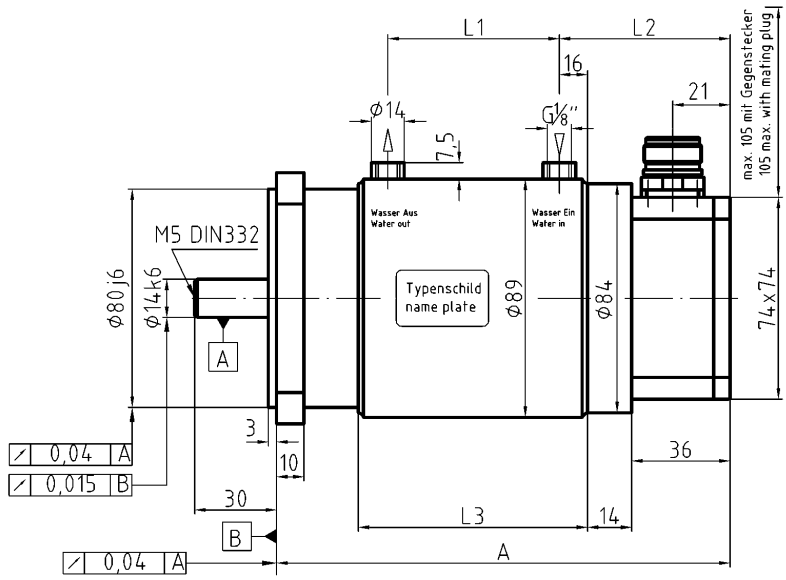
W258F 330 / 560 V_{DC}

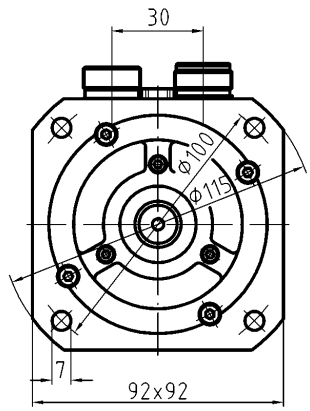


Baugröße: W40x

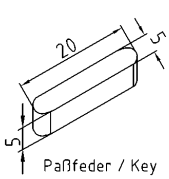
Size: W40x

Maßzeichnungen in mm
Drawings in mm

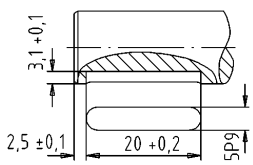




Motortyp	Motor type	W406
A	A	173
L1	L1	67
L2	L2	66
L3	L3	99



Paßfeder / Key
A5x5x20 DIN6885



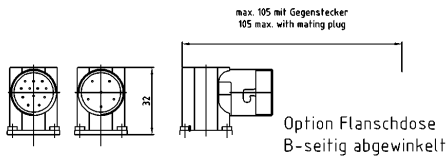
Option Paßnut DIN6885
Option keyway DIN6885

Motor

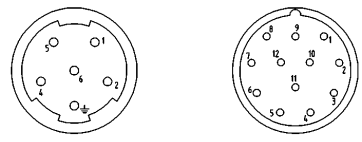
1 U
2 W
5 V
GND

Resolver

1 S1 cos+
2 S3 cos-
3 S4 sin-
4 S2 sin+
5 R1 R
6 R2 L
7 Thermoschalter/ Thermo switch
8 Thermoschalter/ Thermo switch



Option Flanschdose
B-seitig abgewinkelt
Option right-angle socket to B-side



Ansicht Gegenstecker- Lötseite
View from solder side of mating plugs

Resolver-Nenndaten*1

Resolver Data (nominal)*1

Eingangsspannung	Input Voltage	V_{AC} rms	7,0	Übersetzung	Transformation ratio		0,5
Eingangsfrequenz	Input frequency	kHz	10,0	Polzahl	Poles		2
Eingangsstrom	Input current	mA rms	40	Genauigkeit	Accuracy	arcmin	±10
Z_{SO}	Z_{SO}	Ω	245 + J430	Z_{SS}	Z_{SS}	Ω	210 + J395
Z_{RO}	Z_{RO}	Ω	78 + J190	Z_{RS}	Z_{RS}	Ω	65 + J175

*1 Betrieb außerhalb der Nennwerte möglich: ggf. Abweichungen der spezifizierten Ausgangswerte Operation outside nominal values is possible: specified output values may deviate

Standard-Optionen

Standard Options

Welle	Shaft	mit Nut + Passfeder gemäß DIN 6885	with keyway + key according to DIN 6885
Elektrischer Anschluss	El. connection	Flanschdosen in abgewinkelter Ausführung Richtung B-Seite	right angle receptacles directed to B-side

Sonder-Optionen*2

Special Options*2

Schutzart	Protection class	Wellendichtring IP 64	shaft seal IP 64
Rückmeldesystem	Feedback system	Inkrementaldrehgeber, SinCos-Encoder	incremental encoder, SinCos encoder
Getriebe	Gearboxes	spielarme Getriebe	low backlash gearboxes

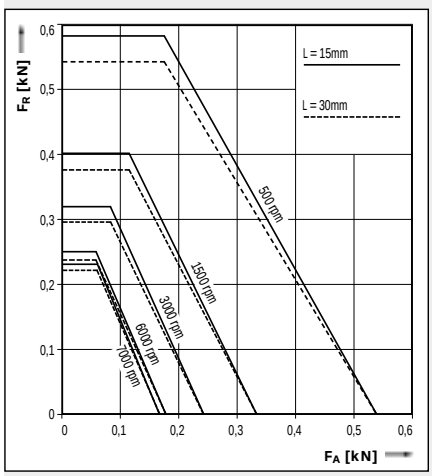
*2 Nähere Informationen auf Anfrage Further information upon request

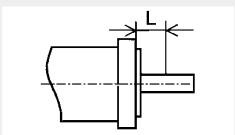
! **Gegenstecker sind separat zu bestellen, Bestell-Nr. 57.397** **Mating plugs have to be ordered separately, order code 57.397** !

Zulässige Radial- und Axialbelastungen der Wellenenden

Radial and axial Shaft Load Capacity

W406





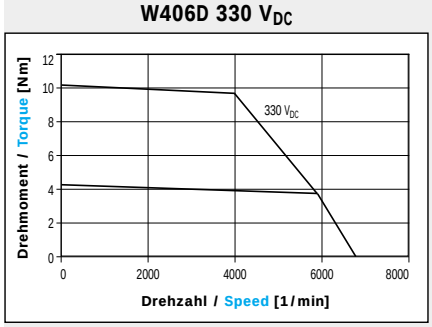
Die angegebenen Werte gelten nur für waagrechten Einbau
The given values for axial and radial load are only for horizontal mounting

Motoren für **330 V_{DC}** (Zwischenkreisspannung) Motors for **330 V_{DC}** (Bus Voltage)

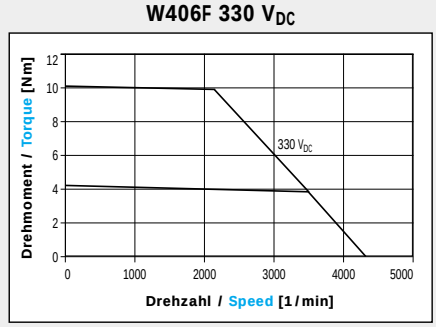
				W406D	W406F				
Stillstandsmoment	Stall torque	M_0	Nm	4,20	4,20				
Stillstandsstrom	Stall current	I_0	A	10,20	5,77				
Nenndrehmoment	Rated torque	M_N	Nm	3,80	3,90				
Nennstrom	Rated current	I_N	A	10,00	5,70				
Nenndrehzahl	Rated speed	n_N	min^{-1}	5850	3522				
Nennleistung	Rated power	P_N	W	2327	1452				
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	25	44				
Drehmomentkonstante	Torque constant	k_T	Nm/A	0,413	0,728				
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	1,26	3,87				
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	2,9	8,8				
Max. Stillstandsmoment	Max. stall torque	$M_{0\ max}$	Nm	10,1	10,1				
Max. Stillstandsstrom	Max. stall current	$I_{0\ max}$	A	27,0	15,6				
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	9000	9000				
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	0,12	0,12				
Masse	Weight	m	kg	3,8	3,8				
Durchflussmenge	Water flow	Q_W	l/min	1,0	1,0				
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	1,6	1,6				

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

W406D 330 V_{DC}



W406F 330 V_{DC}

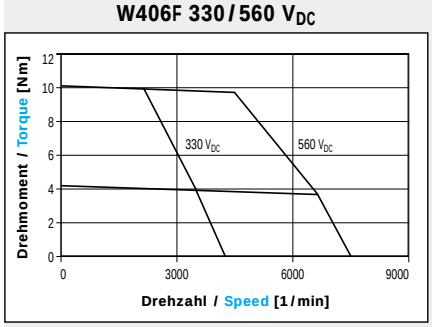


Motoren für **560 V_{DC}** (Zwischenkreisspannung) Motors for **560 V_{DC}** (Bus Voltage)

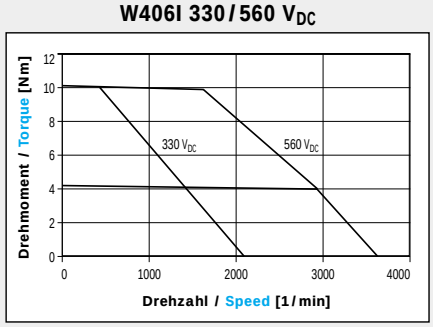
				W406F	W406I				
Stillstandsmoment	Stall torque	M_0	Nm	4,20	4,20				
Stillstandsstrom	Stall current	I_0	A	5,77	2,82				
Nenndrehmoment	Rated torque	M_N	Nm	3,70	4,00				
Nennstrom	Rated current	I_N	A	5,60	2,80				
Nenndrehzahl	Rated speed	n_N	min^{-1}	6534	2919				
Nennleistung	Rated power	P_N	W	2539	1217				
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	44	90				
Drehmomentkonstante	Torque constant	k_T	Nm/A	0,728	1,490				
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	3,87	15,93				
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	8,8	36,5				
Max. Stillstandsmoment	Max. stall torque	$M_{0\ max}$	Nm	10,1	10,1				
Max. Stillstandsstrom	Max. stall current	$I_{0\ max}$	A	15,6	7,7				
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	9000	9000				
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	0,13	0,13				
Masse	Weight	m	kg	3,8	3,8				
Durchflussmenge	Water flow	Q_W	l/min	1,0	1,0				
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	1,6	1,6				

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

W406F 330 / 560 V_{DC}



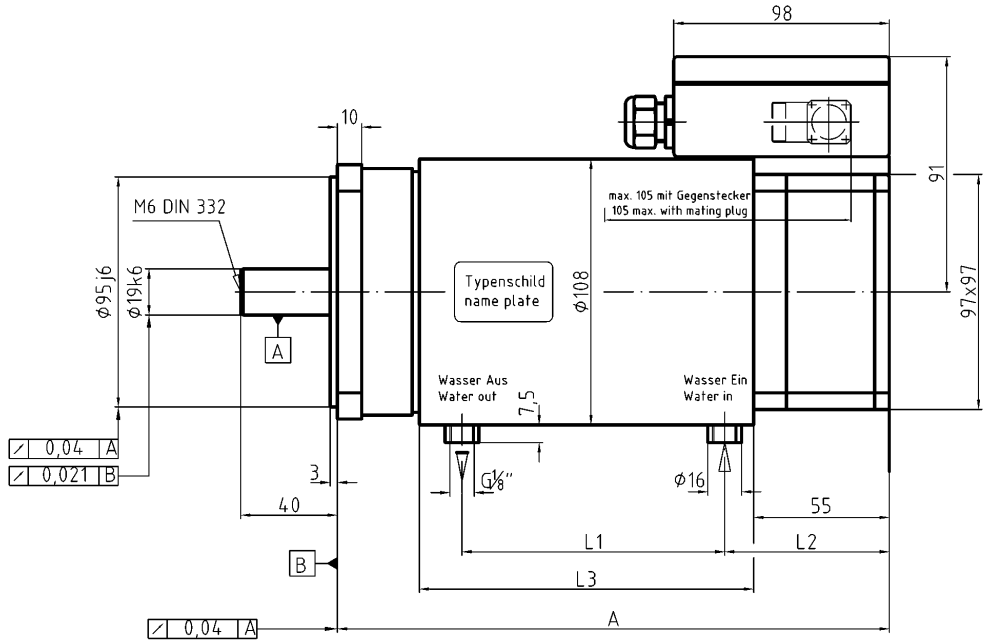
W406I 330 / 560 V_{DC}

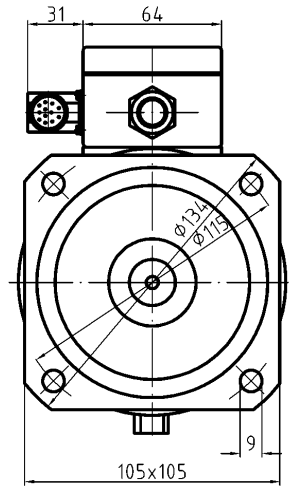


Baugröße: W50x

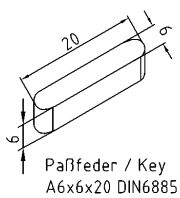
Size: W50x

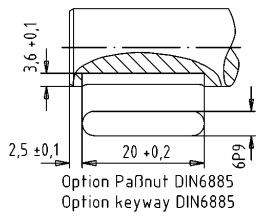
Maßzeichnungen in mm
Drawings in mm





Motortyp	Motor type	W506	W508
A	A	245	290
L1	L1	114	159
L2	L2	78	78
L3	L3	142	187



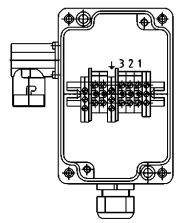


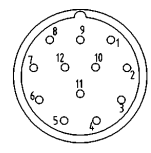
Motor

1 U
2 V
3 W
GND

Resolver

1 S1 cos+
2 S3 cos-
3 S4 sin-
4 S2 sin+
5 R1 R
6 R2 L
7 Thermoschalter/ Thermo switch
8 Thermoschalter/ Thermo switch





Ansicht Gegenstecker- Lötseite
View from solder side of mating plugs

Resolver-Nenndaten*1

Resolver Data (nominal)*1

Eingangsspannung	Input Voltage	V_{AC} rms	7,0	Übersetzung	Transformation ratio		0,5
Eingangsfrequenz	Input frequency	kHz	10,0	Polzahl	Poles		2
Eingangsstrom	Input current	mA rms	40	Genauigkeit	Accuracy	arcmin	±10
Z_{SO}	Z_{SO}	Ω	245 + J430	Z_{SS}	Z_{SS}	Ω	210 + J395
Z_{RO}	Z_{RO}	Ω	78 + J190	Z_{RS}	Z_{RS}	Ω	65 + J175

*1 Betrieb außerhalb der Nennwerte möglich: ggf. Abweichungen der spezifizierten Ausgangswerte Operation outside nominal values is possible: specified output values may deviate

Standard-Optionen

Standard Options

Welle	Shaft	mit Nut + Passfeder gemäß DIN 6885	with keyway + key according to DIN 6885

Sonder-Optionen*2

Special Options*2

Schutzart	Protection class	Wellendichtring IP 64	shaft seal IP 64
Rückmeldesystem	Feedback system	Inkrementaldrehgeber, SinCos-Encoder	incremental encoder, SinCos encoder
Getriebe	Gearboxes	spielarme Getriebe	low backlash gearboxes

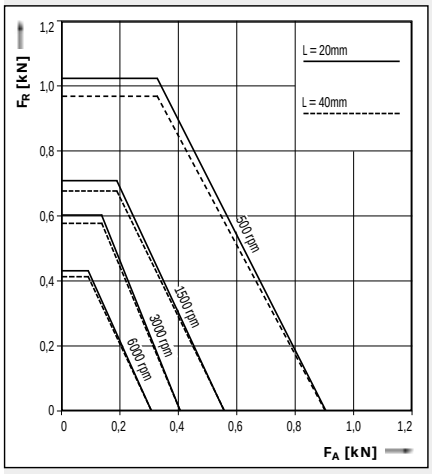
*2 Nähere Informationen auf Anfrage Further information upon request

! **Gegenstecker ist separat zu bestellen, Bestell-Nr. 57.325** **Mating plug has to be ordered separately, order code 57.325** !

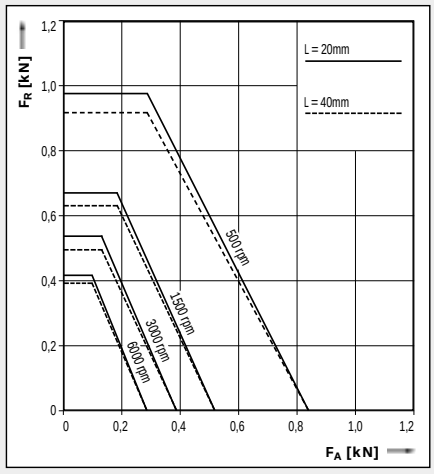
Zulässige Radial- und Axialbelastungen der Wellenenden

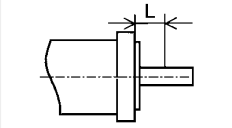
Radial and axial Shaft Load Capacity

W506



W508





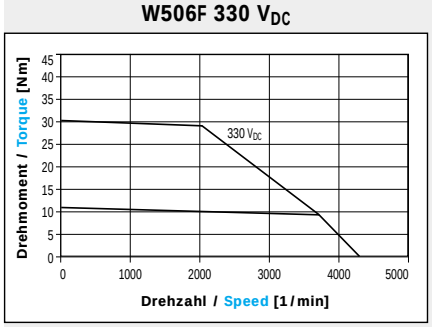
Die angegebenen Werte gelten nur für waagrechten Einbau
The given values for axial and radial load are only for horizontal mounting

Motoren für **330 V_{DC}** (Zwischenkreisspannung) Motors for **330 V_{DC}** (Bus Voltage)

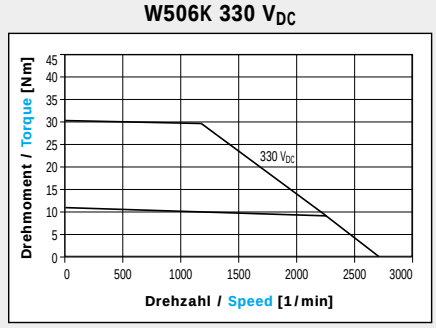
				W506F	W506K		W508F	W508K	
Stillstandsmoment	Stall torque	M_0	Nm	11,0	11,0		21,0	21,0	
Stillstandsstrom	Stall current	I_0	A	15,1	9,5		28,9	18,1	
Nenndrehmoment	Rated torque	M_N	Nm	9,3	9,9		19,0	19,7	
Nennstrom	Rated current	I_N	A	13,4	8,9		30,0	17,6	
Nenndrehzahl	Rated speed	n_N	min^{-1}	3730	2263		3000	2059	
Nennleistung	Rated power	P_N	W	3612	2355		5968	4257	
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	44	70		44	70	
Drehmomentkonstante	Torque constant	k_T	Nm/A	0,730	1,160		0,727	1,160	
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	0,74	1,77		0,45	1,09	
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	4,5	10,8		3,2	7,9	
Max. Stillstandsmoment	Max. stall torque	$M_{0\,max}$	Nm	30,3	30,3		40,0	40,0	
Max. Stillstandsstrom	Max. stall current	$I_{0\,max}$	A	47,0	30,0		62,0	34,0	
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	7500	7500		7500	7500	
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	0,44	0,44		0,61	0,61	
Masse	Weight	m	kg	8,3	8,3		11,0	11,0	
Durchflussmenge	Water flow	Q_W	l/min	1,0	1,0		1,5	1,5	
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	3,5	3,5		9,0	9,0	

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

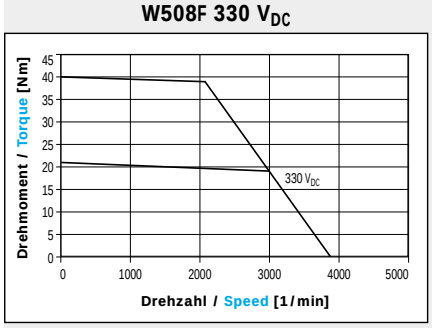
W506F 330 V_{DC}



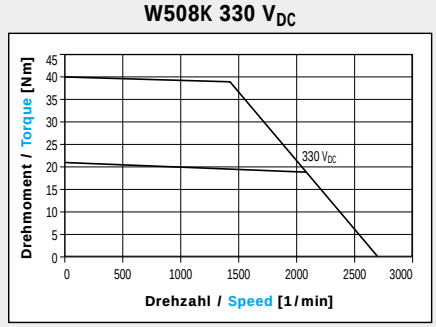
W506K 330 V_{DC}



W508F 330 V_{DC}



W508K 330 V_{DC}

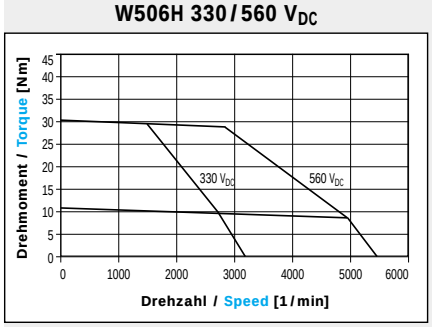


Motoren für **560 V_{DC}** (Zwischenkreisspannung) Motors for **560 V_{DC}** (Bus Voltage)

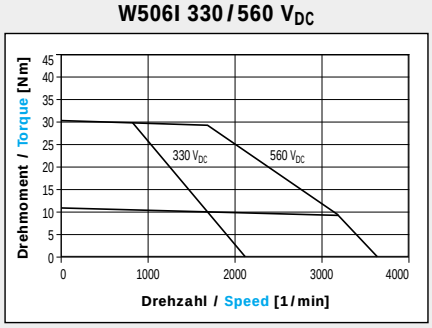
				W506H	W506I		W508H	W508I	
Stillstandsmoment	Stall torque	M_0	Nm	11,0	11,0		21,0	21,0	
Stillstandsstrom	Stall current	I_0	A	11,1	7,4		21,2	14,1	
Nenndrehmoment	Rated torque	M_N	Nm	8,7	9,5		18,3	19,2	
Nennstrom	Rated current	I_N	A	9,4	6,7		19,7	13,5	
Nenndrehzahl	Rated speed	n_N	min^{-1}	4944	3150		4446	2900	
Nennleistung	Rated power	P_N	W	4493	3140		8512	5839	
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	60	90		60	90	
Drehmomentkonstante	Torque constant	k_T	Nm/A	0,992	1,489		0,992	1,489	
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	1,19	2,95		0,81	1,83	
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	7,7	18,1		6,0	12,7	
Max. Stillstandsmoment	Max. stall torque	$M_{0\ max}$	Nm	30,3	30,3		40,0	40,0	
Max. Stillstandsstrom	Max. stall current	$I_{0\ max}$	A	37,0	23,0		39,0	25,0	
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	7500	7500		7500	7500	
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	0,44	0,44		0,61	0,61	
Masse	Weight	m	kg	8,2	8,2		11,0	11,0	
Durchflussmenge	Water flow	Q_W	l/min	1,0	1,0		1,5	1,5	
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	3,5	3,5		9,0	9,0	

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

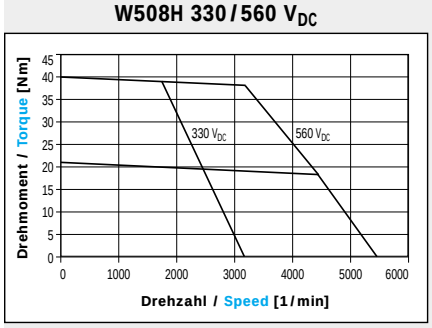
W506H 330 / 560 V_{DC}



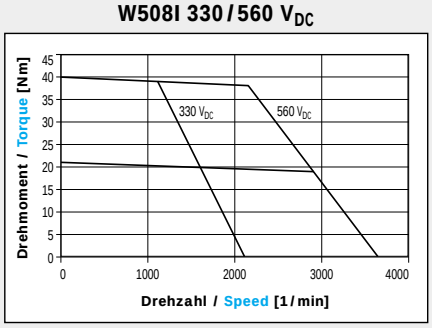
W506I 330 / 560 V_{DC}



W508H 330 / 560 V_{DC}



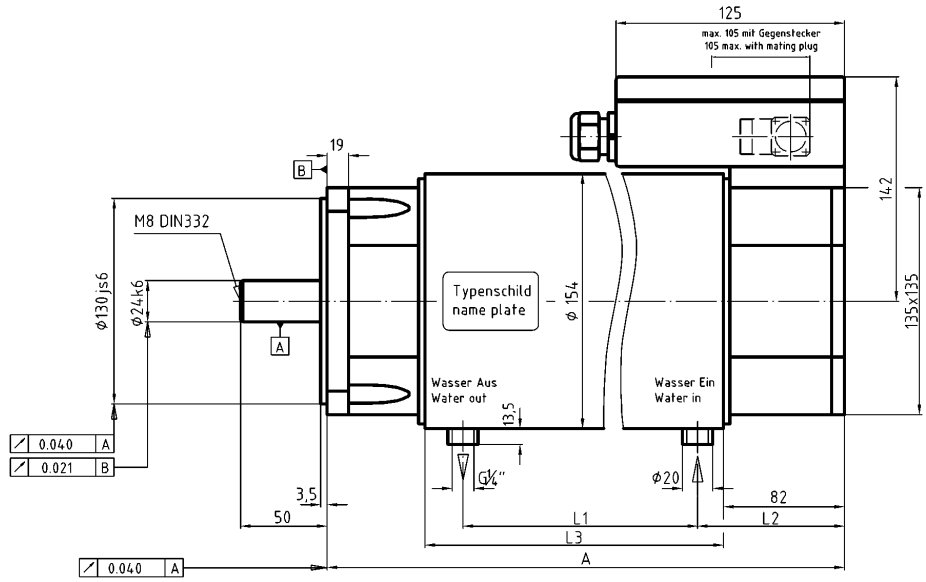
W508I 330 / 560 V_{DC}

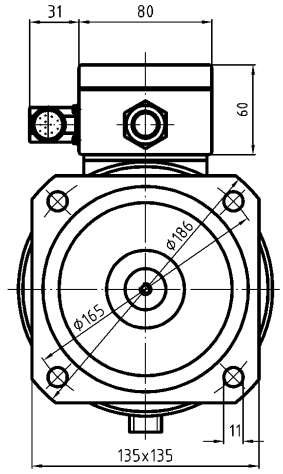


Baugröße: W71x

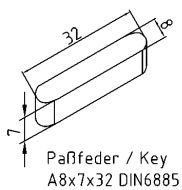
Size: W71x

Maßzeichnungen in mm
Drawings in mm

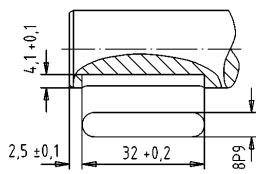




Motortyp	Motor type	W718
A	A	394
L1	L1	217
L2	L2	100
L3	L3	253



Paßfeder / Key
A8x7x32 DIN6885



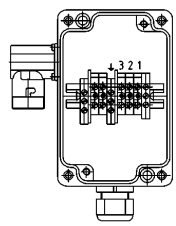
Option Paßnut DIN6885
Option keyway DIN6885

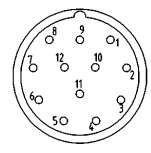
Motor

1 U
2 V
3 W
GND

Resolver

1 S1 cos+
2 S3 cos-
3 S4 sin-
4 S2 sin+
5 R1 R
6 R2 L
7 Thermoschalter/ Thermo switch
8 Thermoschalter/ Thermo switch





Ansicht Gegenstecker- Lötseite
View from solder side of mating plugs

Resolver-Nenndaten*1

Resolver Data (nominal)*1

Eingangsspannung	Input Voltage	V_{AC} rms	7,0	Übersetzung	Transformation ratio		0,5
Eingangsfrequenz	Input frequency	kHz	10,0	Polzahl	Poles		2
Eingangsstrom	Input current	mA rms	30	Genauigkeit	Accuracy	arcmin	±6
Z_{SO}	Z_{SO}	Ω	265 + J485	Z_{SS}	Z_{SS}	Ω	220 + J445
Z_{RO}	Z_{RO}	Ω	145 + J240	Z_{RS}	Z_{RS}	Ω	125 + J220

*1 Betrieb außerhalb der Nennwerte möglich: ggf. Abweichungen der spezifizierten Ausgangswerte Operation outside nominal values is possible: specified output values may deviate

Standard-Optionen

Standard Options

Welle	Shaft	mit Nut + Passfeder gemäß DIN 6885	with keyway + key according to DIN 6885

Sonder-Optionen*2

Special Options*2

Schutzart	Protection class	Wellendichtring IP 64	shaft seal IP 64
Rückmeldesystem	Feedback system	Inkrementaldrehgeber, SinCos-Encoder	incremental encoder, SinCos encoder
Getriebe	Gearboxes	spielarme Getriebe	low backlash gearboxes

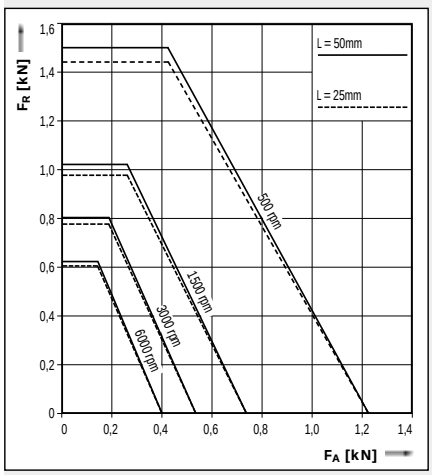
*2 Nähere Informationen auf Anfrage Further information upon request

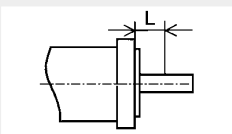
! **Gegenstecker ist separat zu bestellen, Bestell-Nr. 57.325** **Mating plug has to be ordered separately, order code 57.325** !

Zulässige Radial- und Axialbelastungen der Wellenenden

Radial and axial Shaft Load Capacity

W718





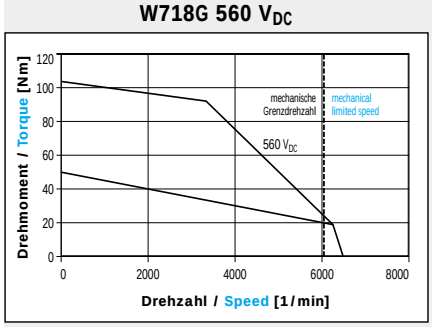
Die angegebenen Werte gelten nur für waagrechten Einbau
The given values for axial and radial load are only for horizontal mounting

Motoren für **560 V_{DC}** (Zwischenkreisspannung) Motors for **560 V_{DC}** (Bus Voltage)

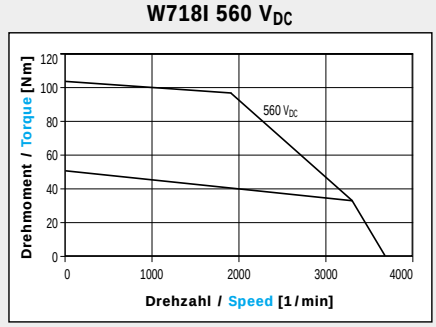
				W718G	W718I	W718L			
Stillstandsmoment	Stall torque	M_0	Nm	50,0	50,0	50,0			
Stillstandsstrom	Stall current	I_0	A	60,0	33,6	25,2			
Nenndrehmoment	Rated torque	M_N	Nm	18,0	33,3	37,8			
Nennstrom	Rated current	I_N	A	24,0	23,5	19,7			
Nenndrehzahl	Rated speed	n_N	min^{-1}	6000	3290	2401			
Nennleistung	Rated power	P_N	W	11309	11490	9517			
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	50	90	120			
Drehmomentkonstante	Torque constant	k_T	Nm/A	0,827	1,489	1,985			
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	0,094	0,310	0,560			
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	1,9	5,2	9,0			
Max. Stillstandsmoment	Max. stall torque	$M_{0\ max}$	Nm	104	104	104			
Max. Stillstandsstrom	Max. stall current	$I_{0\ max}$	A	138	88	66			
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	6000	6000	6000			
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	2,36	2,36	2,36			
Masse	Weight	m	kg	30,0	31,0	31,0			
Durchflussmenge	Water flow	Q_W	l/min	2,0	2,0	2,0			
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	3,0	3,0	3,0			

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

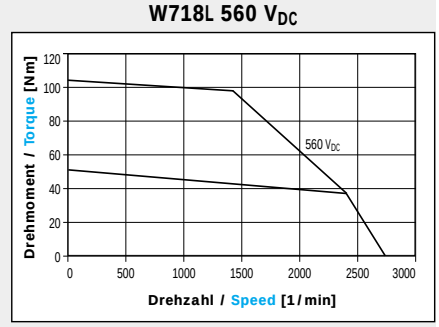
W718G 560 V_{DC}



W718I 560 V_{DC}



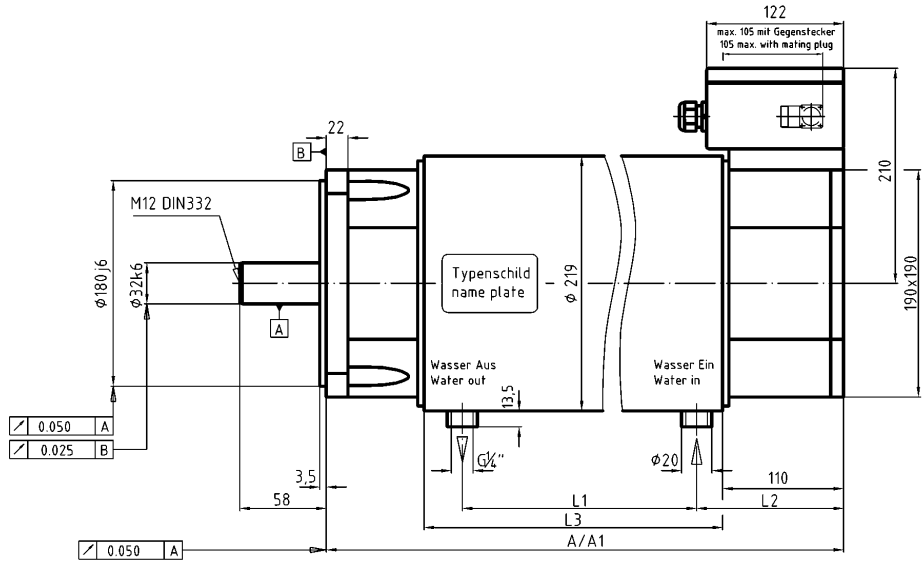
W718L 560 V_{DC}

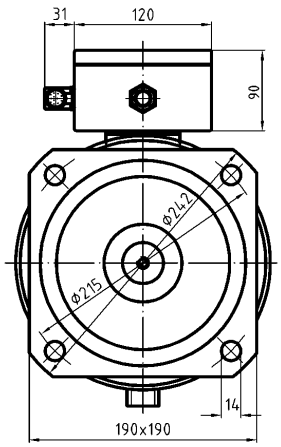


Baugröße: W90x

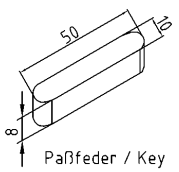
Size: W90x

Maßzeichnungen in mm
Drawings in mm

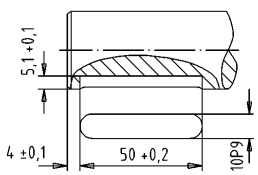




Motortyp	Motor type	W904	W906
A	A	340	415
L1	L1	107	182
L2	L2	128	128
L3	L3	142	217



Paßfeder / Key
A10x8x50 DIN6885



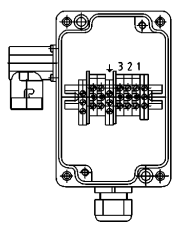
Option Paßnut DIN6885
Option keyway DIN6885

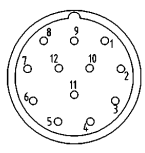
Motor

1 U
2 V
3 W
GND

Resolver

1 S1 cos+
2 S3 cos-
3 S4 sin-
4 S2 sin+
5 R1 R
6 R2 L
7 Thermoschalter/ Thermo switch
8 Thermoschalter/ Thermo switch





Ansicht Gegenstecker- Lötseite
View from solder side of mating plugs

Resolver-Nenndaten*1

Resolver Data (nominal)*1

Eingangsspannung	Input Voltage	V_{AC} rms	7,0	Übersetzung	Transformation ratio		0,5
Eingangsfrequenz	Input frequency	kHz	10,0	Polzahl	Poles		2
Eingangsstrom	Input current	mA rms	30	Genauigkeit	Accuracy	arcmin	±6
Z_{SO}	Z_{SO}	Ω	265 + J485	Z_{SS}	Z_{SS}	Ω	220 + J455
Z_{RO}	Z_{RO}	Ω	145 + J240	Z_{RS}	Z_{RS}	Ω	125 + J220

*1 Betrieb außerhalb der Nennwerte möglich: ggf. Abweichungen der spezifizierten Ausgangswerte Operation outside nominal values is possible: specified output values may deviate

Standard-Optionen

Standard Options

Welle	Shaft	mit Nut + Passfeder gemäß DIN 6885	with keyway + key according to DIN 6885

Sonder-Optionen*2

Special Options*2

Schutzart	Protection class	Wellendichtring IP 64	shaft seal IP 64
Rückmeldesystem	Feedback system	Inkrementaldrehgeber, SinCos-Encoder	incremental encoder, SinCos encoder
Getriebe	Gearboxes	spielarme Getriebe	low backlash gearboxes

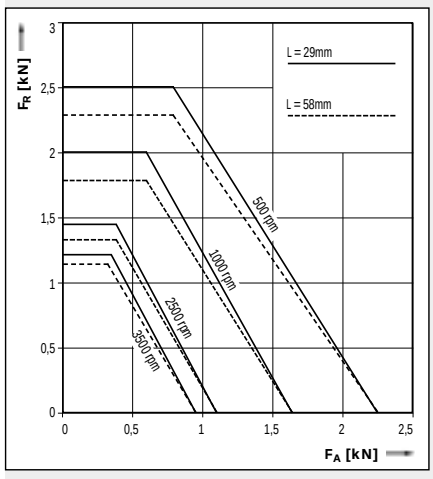
*2 Nähere Informationen auf Anfrage Further information upon request

! **Gegenstecker ist separat zu bestellen, Bestell-Nr. 57.325** **Mating plug has to be ordered separately, order code 57.325** !

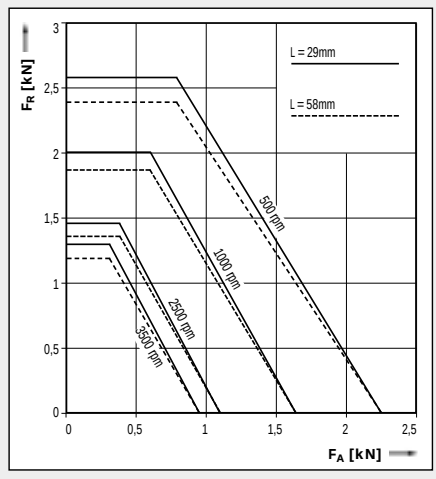
Zulässige Radial- und Axialbelastungen der Wellenenden

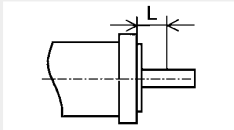
Radial and axial Shaft Load Capacity

W904



W906





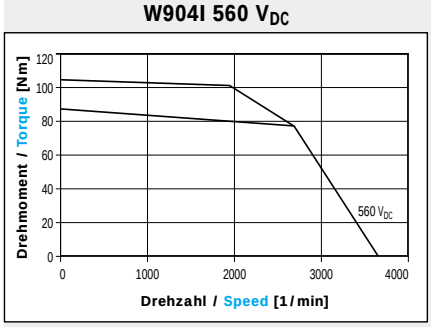
Die angegebenen Werte gelten nur für waagrechten Einbau
The given values for axial and radial load are only for horizontal mounting

Motoren für **560 V_{DC}** (Zwischenkreisspannung) Motors for **560 V_{DC}** (Bus Voltage)

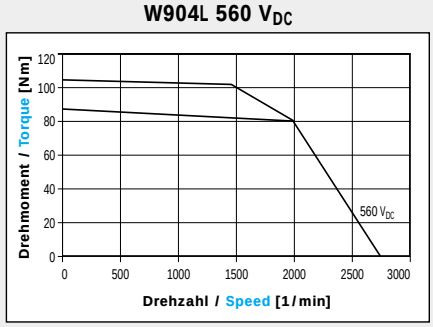
				W904I	W904L	W904N	W906I	W906L	W906N
Stillstandsmoment	Stall torque	M_0	Nm	87,0	87,0	87,0	137,0	137,0	137,0
Stillstandsstrom	Stall current	I_0	A	58,4	44,8	35,1	92,0	69,0	55,2
Nenndrehmoment	Rated torque	M_N	Nm	77,8	80,2	81,7	108,1	116,0	118,9
Nennstrom	Rated current	I_N	A	54,4	41,6	33,7	75,6	60,2	49,1
Nenndrehzahl	Rated speed	n_N	min^{-1}	2671	1978	1534	2759	2003	1724
Nennleistung	Rated power	P_N	W	21769	16616	13132	31224	24324	21471
Spannungskonstante	Back EMF constant	k_E	$V/kmin^{-1}$	90	120	150	90	120	150
Drehmomentkonstante	Torque constant	k_T	Nm/A	1,489	1,980	2,481	1,490	1,980	2,481
Wicklungswiderstand P-P	Winding resistance P-P	R_{U-V}	Ω	0,220	0,350	0,530	0,120	0,210	0,430
Wicklungsinduktivität P-P	Winding inductance P-P	L_{U-V}	mH	4,60	8,10	13,13	3,12	5,52	6,30
Max. Stillstandsmoment	Max. stall torque	$M_{0\,max}$	Nm	105	105	105	181	181	181
Max. Stillstandsstrom	Max. stall current	$I_{0\,max}$	A	93	70	56	142	107	85
Max. zulässige Drehzahl	Max. allowed speed	n_{mech}	min^{-1}	4500	4500	4500	4500	4500	4500
Eigenträgheitsmoment	Inertia	J	$kgm^2 \cdot 10^{-3}$	5,2	5,2	5,2	7,8	7,8	7,8
Masse	Weight	m	kg	33	33	33	49	49	49
Durchflussmenge	Water flow	Q_W	l/min	2,4	2,4	2,4	2,4	2,4	2,4
Wasserdruckdifferenz	Water pressure difference	P_W	kPa	3,5	3,5	3,5	3,5	3,5	3,5

Drehzahl-Drehmoment-Kennlinie Torque-Speed-Curves

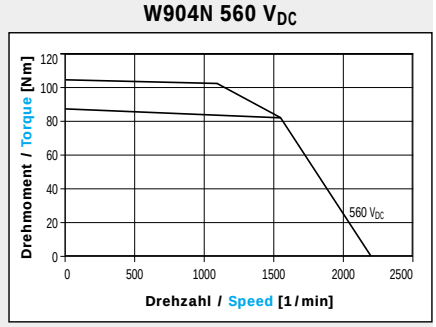
W904I 560 V_{DC}



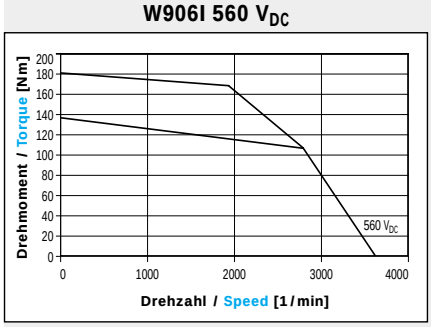
W904L 560 V_{DC}



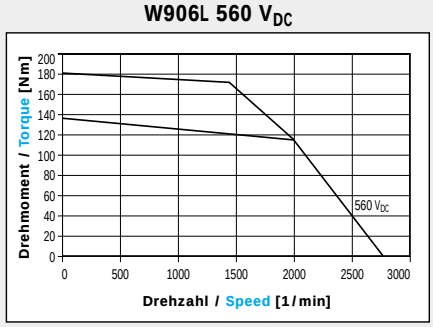
W904N 560 V_{DC}



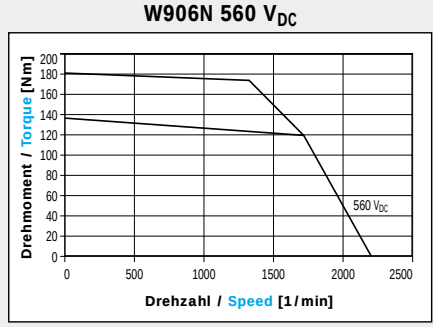
W906I 560 V_{DC}



W906L 560 V_{DC}



W906N 560 V_{DC}



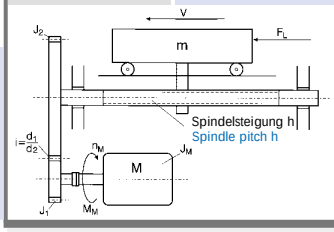
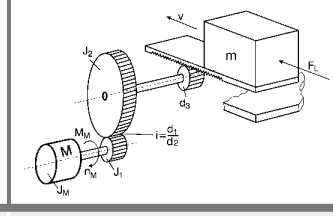
Bestellschlüssel — Order Code

	W	906	I	-	0	S	2	0	1	-	3	00	0	-	0

W	**Baureihe** **Series**	**W**	wassergekühlter Motor	watercooled Motor
		M	schlanker Motor	slim Motor
		F	kurzer Motor	short Motor
906	**Motorgröße** **Motor size**		25x, 40x, 50x, 71x und 90x	25x, 40x, 50x, 71x and 90x
I	**Wicklungskonstante** **Winding**		siehe Datenblatt	refer to datasheet
-				
0	**Option 1** **Option 1**	**0**	ohne Haltebremse	without holding brake
S	**Option 2** **Option 2**	**0**	Bezeichnung mit vorherigem Typenschlüssel (wird bei neuen Artikeln nicht mehr verwendet)	classification with previous order code (not used for new items)
		S	Bezeichnung mit Standard-Typenschlüssel	classification with standard order code
2	**Fertigungsstand** **Revision level**			
0	**Thermoschutz** **Thermal protection**	**0**	Thermoschalter	thermo switch
1	**Schutzart** **Protection class**	**1**	IP65 ohne A-Seite	IP65 without A-side
-				
3	**Elektrische Anschlüsse** **Connectors**	**0**	gerade Flanschdosen gemäß Zeichnung (W25x, W40x)	straight receptacles according to drawing (W25x W40x)
		3	Standard-Klemmenkasten mit seitlicher Resolverflanschdose gemäß Zeichnung (W50x, W71x, W90x)	conduit box with resolver connector to the side acc. to drawing (W50x, W71x, W90x)
		8	Winkelstecker Richtung B-Seite (W25x, W40x)	right angle connectors in B-side direction (W25x, W40x)
00	**Geberhersteller und Typ** **Resolver type**	**00**	Standard „BAUTZ“ Resolver	standard “BAUTZ“ resolver
0	**Wellen und Flanschausführung** **Shaft and flange**	**0**	Standard mit Gewindebohrung gemäß Zeichnung (bis auf W25)	standard with tapped hole acc. to drawing (except W25)
		3	Standard-Nut mit Passfeder in Welle nach Maßzeichnung, siehe Datenblatt	standard keyway and key acc. to datasheet
-				
0	**Variante** **Version**	**0**	Standard	standard

! Allen Berechnungen sollten die ungünstigsten Betriebsbedingungen zugrunde gelegt werden.

! All calculations should be carried out on the basis of the most severe operating conditions.

	Spindelantrieb / Ball screw drive	Zahnstangenantrieb / Rack + pinion drive
		
Motordrehzahl Motor speed	$n_M = \frac{v \cdot 6 \cdot 10^4}{h \cdot i}$ [1/min]	$n_M = \frac{v \cdot 6 \cdot 10^4}{\pi \cdot d_3\, i}$ [1/min]
Lastmoment Load torque	$M_L = h \cdot i \cdot \frac{F_L}{2000 \cdot \pi}$ [Nm]	$M_L = d_3 \cdot i \cdot \frac{F_L}{2000}$ [Nm]
Translatorisches Massenträgheitsmoment Linear moment of inertia	$J_T = m_T \cdot \left(\frac{h}{2 \cdot \pi}\right)^2 \cdot 10^{-6}$ [kgm²]	$J_T = m_T \cdot \left(\frac{d_3}{2}\right)^2 \cdot 10^{-6}$ [kgm²]
Rotatorisches Massenträgheitsmoment (für Aluminium ist der Wert mit dem Faktor 0,35 zu multiplizieren) Rotary moment of inertia (for aluminium the value must be multipled by 0,35)	$J_R = \frac{\pi}{32} \cdot 10^{-15} \cdot d^4 \cdot l \cdot \rho = 7{,}7 \cdot d^4 \cdot l \cdot 10^{-13}$ [kgm²] (für Stahl / for steel)	
Summe der reduzierten Massenträgheitsmomente Sum of reduced moments of inertias	$J = J_M + J_1 + i^2 (J_R + J_T)$ [kgm²]	
Beschleunigungs- oder Bremsmoment $M_B = f(n_M)$ Acceleration- / deceleration torque $M_B = f(n_M)$	$M_B = \frac{2 \cdot \pi \cdot n_M \cdot J}{60 \cdot t_B} = \frac{n_M \cdot J}{9{,}55 \cdot t_B}$ [Nm]	
Beschleunigungs- oder Bremsmoment $M_B = f(s_B)$ Acceleration- / deceleration torque $M_B = f(s_B)$	$M_B = \frac{4 \cdot \pi \cdot s_B \cdot J}{h \cdot i \cdot t_B^2}$ [Nm]	$M_B = \frac{4 \cdot s_B \cdot J}{d_3 \cdot i \cdot t_B^2}$ [Nm]
Beschleunigungs- oder Bremszeit $t_B = f(n_M)$ Acceleration- / deceleration time $t_B = f(n_M)$	$t_B = \frac{2 \cdot \pi \cdot n_M \cdot J}{60 \cdot M_B} = \frac{n_M \cdot J}{9{,}55 \cdot M_B}$ [s]	
Beschleunigungs- oder Bremszeit $t_B = f(s_B)$ Acceleration- / deceleration time $t_B = f(s_B)$	$t_B = \sqrt{\frac{4 \cdot \pi \cdot s_B \cdot J}{h \cdot i \cdot M_B}}$ [s]	$t_B = \sqrt{\frac{4 \cdot s_B \cdot J}{d_3 \cdot i \cdot M_B}}$ [s]
Nach der Beschleunigung erreichte Drehzahl Speed obtained after acceleration	$n_M = \frac{120 \cdot s_B}{h \cdot i \cdot t_B}$ [1/min]	$n_M = \frac{120 \cdot s_B}{d_3 \cdot \pi \cdot i \cdot t_B}$ [1/min]
Während der Beschleunigung zurückgelegter Weg Distance moved during acceleration	$s_B = \frac{n_M \cdot t_B \cdot h \cdot i}{120}$ [mm]	$s_B = \frac{n_M \cdot t_B \cdot \pi \cdot d_3 \cdot i}{120}$ [mm]
Abgegebene Leistung Output power	$P_A = \frac{M_M \cdot n_M}{9{,}55}$ [W]	

LEGENDE

d	Ø des Zylinders [mm] Ø of the cylinder [mm]	i	Untersetzung (d_1/d_2) gear reduction (d_1/d_2)
d_1	Ø treibendes Rad [mm] Ø of the driving wheel [mm]	l	Länge des Zylinders [mm] Cylinder length [mm]
d_2	Ø getriebenes Rad [mm] Ø of driven wheel [mm]	m	Masse des Zylinders [kg] Cylinder mass [kg]
d_3	Ø Ritzel [mm] Ø of pinion [mm]	M	Drehmoment [Nm] Torque [Nm]
F_L	Vorschubkraft [N] Force [N]	M_B	Beschleunigungs- bzw. Bremsmoment [Nm] Acceleration- / deceleration torque [Nm]
h	Spindelsteigung [mm] Spindle pitch [mm]	M_D	Dauermoment [Nm] Continuous torque [Nm]

LEGEND

M_I	Impulsmoment [Nm] Peak torque [Nm]	J_M	Massenträgheitsmoment des Motors [kgm²] Motor inertia [kgm²]
M_L	Lastmoment [Nma] Load torque [Nma]	J_R	Rotat. Massenträgheitsmoment [kgm²] Rotary inertia [kgm²]
M_M	Motormoment [Nm] Motor torque [Nm]	J_T	Translat. Massenträgheitsmoment [kgm²] Linear inertia [kgm²]
M_R	Reibmoment [Nm] Friction torque [Nm]	S_B	Beschleunigungs- bzw. Bremsweg [mm] Acceleration- / deceleration distance [mm]
n_M	Motordrehzahl [min.⁻¹] Motor speed [min.⁻¹]	t_B	Beschleunigungs- bzw. Bremszeit [s] Acceleration- / deceleration time [s]
P_A	Abgegebene Leistung [W] Output power [W]	v	Vorschubgeschwindigkeit [m/s] Feed rate [m/s]
J	Massenträgheitsmoment [kgm²] Mass inertia [kgm²]	ρ	Dichte [kg/m³] Density [kg/m³]

UMRECHNUNG VON DREHMOMENTEN

TORQUE CONVERSION TABLE

A \ B	Nm	Ncm	kp cm	oz in
Nm	1	10^2	10,19716	$1{,}41612 \cdot 10^2$
Ncm	10^{-2}	1	0,1019716	1,41612
kp cm	$9{,}80665 \cdot 10^{-2}$	9,80665	1	13,8874
oz in	$7{,}06155 \cdot 10^{-3}$	0,706155	$7{,}20077 \cdot 10^{-2}$	1

UMRECHNUNG VON MASSEN-TRÄGHEITSMOMENTEN

INERTIA CONVERSION TABLE

A \ B	kgm²	kpcm s²	oz in s²	lb in s²
kgm²	1	10,1972	$1{,}41612 \cdot 10^2$	8,850732
kpcm s²	$9{,}80665 \cdot 10^{-2}$	1	13,88741	$3{,}35109 \cdot 10^2$
oz in s²	$7{,}06154 \cdot 10^{-3}$	$7{,}20077 \cdot 10^{-2}$	1	$6{,}250 \cdot 10^{-2}$
lb in s²	0,112985	1,152126	16	1

! Das Drehmoment oder das Trägheitsmoment im gegebenen Maßsystem (A) wird mit dem Umrechnungsfaktor (im Feld) für das gesuchte Maßsystem (B) multipliziert.

Achtung: Bei der Umrechnung des sogenannten „Schwungmomentes GD^2" ist zu beachten, dass der Zahlenwert von GD^2 in kpm² gleich dem vierfachen Zahlenwert des Massenträgheitsmomentes J in kgm² ist.

! Torque or inertia of the given measurement system (A) have to be multiplied with the conversionfactor for the requested measurement system (B).

Attention: For the conversion of the flywheel moment (GD^2) please note, that the value of GD^2 in kpm² is four times the value of the mass inertia J in kgm².

BAUTZ

Eduard Bautz GmbH + Co.KG
Robert-Bosch-Straße 10
D-64331 Weiterstadt
Tel: +49 (0) 6151/8796-10
Fax: +49 (0) 6151/8796-123
E-Mail: Vertrieb@ebautz.de
www.bautzgmbh.com

KAT-W/D/GB/01/03.01/ZW